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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/512,593	02/23/2000	John W. Eaton	5050/651	3307

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EXAMINER	
RAMIREZ, JOHN FERNANDO	
ART UNIT	PAPER NUMBER
3737	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/512,593	EATON ET AL.	
	Examiner	Art Unit	
	JOHN F. RAMIREZ	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-88* is/are pending in the application.

4a) Of the above claim(s) *77, 80-88* is/are withdrawn from consideration.

5)☒ Claim(s) *15-19,24-26,55-62 and 66* is/are allowed.

6)☒ Claim(s) *1-5,7-11,20-23,27-32,35-40,63,64,67,68,75,76,78 and 79* is/are rejected.

7)☒ Claim(s) *6,12-14,33,41-54,65 and 69-74* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 75-76 and 78-79 are again rejected under 35 USC103(a) as obvious based upon Bechai et al. (US 4,417,583) or linuma (US 5,450,850), in either case further in view of Seward et al (US 5,699,805 of record) and/or Eberle et al (US 5,368,037 of record).

Bechai et al as well as Iinuma teach inclusion of both endfire 50 or A and sidefire 48 or B arrays at the tip of a catheter-like probe for driving selective displays. Whereas they do not respectively refer to their device as a catheter, it would have been obvious in view of Seward et al which teaches an ultrasound catheter including as plurality of (longitudinal) linear phased arrays at the distal end that a device such as in Bechai et al is in fact a catheter of esophageal-inserted type. In the alternative, it would have been obvious in view of Eberle et al to provide such end or side-fire arrays on an ultrasound (intravascular) catheter since these were also known to provide scan information from within vessel walls (Claims 1, 75). Seward et al makes clear in col. 6, lines 11-22 that the disclosed catheter is usable inside the blood vessel or inside a cavity such as the esophagus where upon it would have reasonably been called a transesophageal imaging catheter.

Eberle et al teaches that when arrays are adapted for an intravascular catheter the imaging catheter may be made as small as 1 mm diameter, see col. 11, lines 65-68. (Claims 76, 78-79).

Claims 2-4, 27-29, 35-36 are again rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, or in the case of Bechai et al further in view of Iinuma (US5450850). Whereas only Seward et al refer to their array as a phased (and also planar) array, it would have been obvious in view of Iinuma Figs. 15-16 and col. 13, lines 11-28 to provide phasing to both a longitudinal

linear and a generally radial or annular array on the tip of a (catheter or catheter-like) probe since this allows resolution for an image in two geometries (claim 2).

Both Seward et al and Iinuma teach linear arrays oriented such that the scan azimuth is parallel to the longitudinal array axis (claim 3).

In Iinuma for example the reversal of the two arrays proximal to distal would be inherently obvious since the perpendicular array orientations merely provide three-dimensional information from closely adjacent positions which is achievable in either order of array, proximal to distal (claims 4, 35-36).

Claims 5 and 30-31, 38-40 and 67 are again rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 2, 35 above, and further in view of Kitney et al (US5081993 of record) since whereas the former are silent as to the use of an additional radial array, Kitney et al Fig. 4 vs Fig. 3 details that an additional radial array may be added to a catheter device in order that 3D scanning may be rapidly had by energizing sub-arrays in more than one plane simultaneously. (Claims 5, 30- 31, 38-40).

Kitney et al further teaches that a position sensor may be included in such a catheter tip, see col. 12, lines 31-64 (Claim 67).

Claim 68 is again rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 67 above, and further in view of Martinelli (US4821731).

Whereas Kitney et al teach a radiographic and a spark-gap position-sensing alternative, it would have been obvious in view of Martinelli et al to provide a magnetic position sensing tip in order to provide the position location called for in Kitney et al since this was a well-known sensor alternative.

Claims 10, 32, 37 are again rejected under 35 USC 103(a) as obvious based upon the references as applied against claims 2 or 5 or 36 above, and further in View of Fujio et al (US5471988).

Whereas the former do not discuss forward curving of the linear array around the catheter tip, it would have been obvious in view of Fujio et al Fig.55A element 347 to do so since this would provide the viewing array to forward look in Iinuma while allowing a blunt rounded tip penetration profile in Bechai et al.

Claims 7 -9, 11 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Iinuma and Seward et al.

Both references teach use of plural arrays on the distal tip of a catheter-like device with displays for viewing the scans therefrom; in Iinuma a combined radial and longitudinal phased array pair is taught. Since Seward et al phased array catheters as suitable for intravascular use while Iinuma teaches transmit and receive beamformers 13, 23 for association with phased longitudinal and radial arrays such as Figs. 15-1, either reference may serve as a base reference modified by the other.

Claims 20-23, 63-64 are again rejected under 35 U.S.C. 102(b) as obvious over linuma in view of Seward et al.

Since linuma computes ejection fraction based upon imaging of cardiac structure with a conventional extra-thoracic probe 16, the tomography-based aortic area determinations done by the dual linear and at least partly radial arrays of probe 121 are in effect part of a cardiac structure imaging method, whereupon Seward et al. is merely relied upon to evidence that probe 121 of linuma would be designated a catheter.

Allowable Subject Matter

Claims 6, 12-14, 33-34, 41-54, 65 and 69-74 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 15-19, 24-26, 55-62 and 66 are allowed.

The offer filed on 2-23-2000 to surrender the original patent is again noted. Patent citations provided on the accompanying PT0-892 show the designation of transesophageal imaging probes as catheter devices by those working in the art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN F. RAMIREZ whose telephone number is (571)272-8685. The examiner can normally be reached on (Mon-Fri) 7:00 - 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian L Casler/
Supervisory Patent Examiner, Art Unit 3737

/J. F. R./
Examiner, Art Unit 3737